CLAIMS:

1. A method of preparing a polymeric material, comprising:

reacting a monohydroxy aromatic compound in the presence of a catalyst, oxygen, and a solvent to form a poly(arylene ether);

combining the poly(arylene ether) with a poly(alkenyl aromatic) to form a mixture;

obtaining a polymeric material from the mixture, wherein the polymeric material comprises poly(arylene ether) and poly(alkenyl aromatic); and

purifying the monohydroxy aromatic compound, the solvent, the poly(arylene ether), the poly(alkenyl aromatic), the mixture, the polymeric material, or a combination of the foregoing to result in the polymeric material substantially free of visible particulate impurities.

2. The method of claim 1, wherein the poly(alkenyl aromatic) is in the form of a solution, melt, or solid.

3. The method of claim 1, wherein the poly(arylene ether) is in the form of a solution, melt, or solid.

4. The method of claim 1, wherein the poly(arylene ether) is isolated from a reaction mixture formed from reacting the monohydroxy aromatic compound in the presence of the catalyst, oxygen, and solvent.

5. The method of claim 4, further comprising adding water and a chelating agent to the reaction mixture to form an aqueous phase and an organic phase, and separating the aqueous phase from the organic phase, wherein the organic phase comprises poly(arylene ether).

6. The method of claim 5, further comprising filtering the organic phase through a filtration system to remove particulate impurities.

7. The method of claim 6, wherein the filtration system comprises a filter having a pore size of about 0.01 to about 50 micrometers.

8. The method of claim 6, wherein the filtration system comprises a sintered metal filter, a cloth filter, a fiber filter, a paper filter, a pulp filter, a metal mesh filter, a ceramic filter, or a combination comprising at least one of the foregoing filters.

9. The method of claim 6, wherein the filtration system comprises a filter having a geometry that is cone, pleated, candle, stack, flat, wraparound, or a combination comprising at least one of the foregoing geometries.

10. The method of claim 5, further comprising washing the organic phase with an aqueous solvent.

11. The method of claim 5, further comprising concentrating the organic phase by removing solvent to form a concentrated organic phase.

12. The method of claim 11, further comprising filtering the concentrated organic phase through a filtration system to remove particulate impurities.

13. The method of claim 4, wherein the poly(arylene ether) is in the form of a solid, and wherein the solid poly(arylene ether) is a powder formed by precipitation of poly(arylene ether) from an organic phase of the reaction mixture comprising an aqueous phase and the organic phase, wherein the organic phase comprises poly(arylene ether).

14. The method of claim 13, further comprising reslurrying the precipitated poly(arylene ether) with a solvent prior to isolating.

15. The method of claim 13, further comprising drying the poly(arylene ether) powder formed by precipitation.

16. The method of claim 15, wherein the poly(arylene ether) is precipitated, collected, and dried in an environment substantially free of particulate impurities.

17. The method of claim 13, further comprising filtering the organic phase to remove particulate impurities prior to precipitation of the poly(arylene ether).

18. The method of claim 4, further comprising isolating the poly(arylene ether) from the reaction mixture; and transporting and storing the poly(arylene ether) in an environment substantially free of particulate impurities.

19. The method of claim 1, filtering the poly(arylene ether), poly(alkenyl aromatic), or both to remove particulate impurities prior to the combining step.

20. The method of claim 1, wherein the polymeric material is substantially free of particulate impurities greater than about 15 micrometers.

21. The method of claim 1, wherein the mixture is formed by melt blending poly(arylene ether) and poly(alkenyl aromatic) to form a melt mixture.

22. The method of claim 21, further comprising melt filtering the melt mixture through a melt filtration system.

23. The method of claim 22, wherein the melt filtration system comprises a sintered metal filter, a metal mesh filter, a fiber metal felt filter, a ceramic filter, or a combination of the foregoing filters.

24. The method of claim 22, wherein the melt filtration system comprises a filter having a geometry that is cone, pleated, candle, stack, flat, wraparound, or a combination comprising at least one of the foregoing geometries.

25. The method of claim 22, wherein the melt filtration system comprises a continuous filtration system or a batch filtration system.

26. The method of claim 22, wherein the melt filtration system comprises a filter having a pore size of about 0.5 to about 200 micrometers.

27. The method of claim 22, wherein the melt filtration system is maintained at a temperature of about 260°C to about 380°C.

28. The method of claim 22, wherein the melt blending occurs in a twin screw counter-rotating extruder, a twin screw co-rotating extruder, a single screw extruder, a single screw reciprocating extruder, or a ring extruder.

29. The method of claim 28, wherein the extruder has a specific throughput rate of about 0.5 kg/cm^3 to about 8 kg/cm^3.

30. The method of claim 28, wherein the extruder further comprises a melt pump.

31. The method of claim 28, wherein the melt has a residence time in the extruder of less than or equal to about 1 minute.

32. The method of claim 22, further comprising compounding the poly(arylene ether) and poly(alkenyl aromatic) prior to melt blending.

33. The method of claim 32, wherein the compounding is performed in a counterrotating conical extruder, or a counterrotating extruder.

34. The method of claim 1, wherein the mixture is formed by combining poly(arylene ether), poly(alkenyl aromatic), and a solvent to form a solution mixture.

35. The method of claim 1, wherein the mixture is formed by combining poly(arylene ether) powder and poly(alkenyl aromatic) powder to form a powder mixture.

36. The method of claim 1, wherein the combining is performed in an environment substantially free of particulate impurities.

37. The method of claim 1, wherein the combining is performed under an inert atmosphere.

38. The method of claim 1, wherein the mixture is filtered using a filtration system to remove particulate impurities.

39. The method of claim 38, wherein the filtration system comprises a filter having a pore size of about 0.01 to about 50 micrometers.

40. The method of claim 38, wherein the filtration system comprises a sintered metal filter, a cloth filter, a fiber filter, a paper filter, a pulp filter, a metal mesh filter, a ceramic filter, or a combination comprising at least one of the foregoing filters.

41. The method of claim 38, wherein the filtration system comprises a filter having a geometry that is cone, pleated, candle, stack, flat, wraparound, or a combination comprising at least one of the foregoing geometries.

42. The method of claim 1, wherein the mixture is a solution, melt, or powder.

43. The method of claim 1, wherein the polymeric material is obtained from the mixture by precipitation, or by the removal of solvent using a devolatilization extruder, a flash vessel, a distillation system, or a combination comprising at least one of the foregoing.

44. The method of claim 1, further comprising superheating the mixture; filtering the superheated mixture to form a superheated filtrate; feeding the superheated filtrate to an extruder, wherein the extruder comprises an upstream vent and a downstream vent; removing solvent from the filtrate via the upstream vent and the downstream vent; and obtaining a polymeric material.

45. The method of claim 44, wherein the polymeric material is obtained in the form of a pellet.

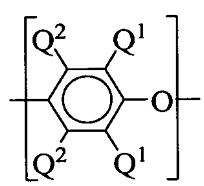
46. The method of claim 1, wherein an organic phase of the reaction mixture comprising the poly(arylene ether) is fed into a devolatilization extruder and the poly(alkylene aromatic) is fed to the extruder via a side feeder to form the mixture.

47. The method of claim 1, wherein the polymeric material is obtained in an environment substantially free of particulate impurities.

48. The method of claim 47, further comprising packaging, storing, or packaging and storing the polymeric material in an environment substantially free of particulate impurities.

49. The method of claim 1, wherein the obtaining is performed under an inert atomosphere.

50. The method of claim 1, wherein the poly(arylene ether) comprises a plurality of structural units of the structure

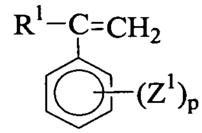


wherein for each structural unit, each Q^1 is independently halogen, primary or secondary C_1-C_7 alkyl, phenyl, haloalkyl, aminoalkyl, hydrocarbonoxy, or halohydrocarbonoxy wherein at least two carbon atoms separate the halogen and oxygen atoms; and each Q^2 is independently hydrogen, halogen, primary or secondary lower alkyl, phenyl, haloalkyl, hydrocarbonoxy, or halohydrocarbonoxy wherein at least two carbon atoms separate the halogen and oxygen atoms.

51. The method of claim 50, wherein the poly(arylene ether) has an intrinsic viscosity of about 0.10 to about 0.60 deciliters per gram as measured in chloroform at 25°C.

52. The method of claim 1, wherein the poly(arylene ether) is salicylate capped poly(arylene ether).

53. The method of claim 1, wherein the poly(alkenyl aromatic) contains at least 25% by weight of structural units derived from an alkenyl aromatic monomer of the formula



wherein R^1 is hydrogen, C_1-C_8 alkyl, or halogen; Z^1 is vinyl, halogen or C_1-C_8 alkyl; and p is 0 to 5.

54. The method of 1, wherein the poly(alkenyl aromatic) is atactic crystal polystyrene.

55. The method of claim 1, wherein the polymeric material comprises about 90 to about 10 percent by weight of the poly(arylene ether) and about 10 to about 90 percent by weight of the poly(alkenyl aromatic).

56. The method of claim 1, wherein the polymeric material comprises about 60 to about 30 percent by weight of the poly(arylene ether) and about 40 to about 70 percent by weight of the poly(alkenyl aromatic).

57. The method of claim 1, wherein the polymeric material further comprises flame retardants, mold release agents, lubricants, antioxidants, thermal stabilizers, ultraviolet stabilizers, pigments, dyes, colorants, anti-static agents, conductive agents, or a combination comprising at least one of the foregoing additives.

58. The method of claim 1, wherein the solvent is a halogenated aromatic solvent, a halogenated aliphatic solvent, a non-halogenated aromatic solvent, a non-halogenated aliphatic solvent, or a combination comprising at least one of the foregoing solvents.

59. The method of claim 1, wherein the solvent is ortho-dichlorobenzene or toluene.

60. The method of claim 1, wherein the polymeric material is obtained in the form of a pellet, powder, or flake.

61. An article comprising the polymeric material prepared by the method of claim 1, wherein the article is formed by injection molding, direct injection molding, blow molding, extrusion, sheet extrusion, film extrusion, profile extrusion, pultrusion, compression molding, thermoforming, pressure forming, hydroforming, or vacuum forming.

62. A data storage medium comprising the polymeric material prepared by the method of claim 1.

63. A method of preparing a polymeric material, comprising:

combining poly(arylene ether) and poly(alkenyl aromatic) to form a mixture;

obtaining a polymeric material from the mixture wherein the polymeric material comprises poly(arylene ether) and poly(alkenyl aromatic);

purifying the poly(arylene ether), the poly(alkenyl aromatic), the mixture, the polymeric material, or a combination of the foregoing; and

packaging, storing, or packaging and storing the polymeric material, wherein the polymeric material is substantially free of visible particulate impurities.

64. The method of claim 63, wherein the combining, the obtaining, the packaging, or a combination of the foregoing steps is performed in an environment substantially free of particulate impurities.

65. The method of claim 63, wherein the combining, the obtaining, the purifying, or a combination of the foregoing steps is performed under an inert atmosphere.

66. The method of claim 63, wherein the poly(arylene ether), poly(alkenyl aromatic), and the mixture are independently in the form of a solution, melt, or solid.

67. The method of claim 66, wherein the poly(arylene ether), poly(alkenyl aromatic), and the mixture are independently in the form of a solution, and wherein the solution is filtered through a filtration system to remove particulate impurities.

68. The method of claim 67, wherein the filtration system comprises a filter having a pore size of about 0.01 to about 50 micrometers.

69. The method of claim 67, wherein the filtration system comprises a sintered metal filter, a cloth filter, a fiber filter, a paper filter, a pulp filter, a metal mesh filter, a ceramic filter, or a combination of the foregoing filters.

70. The method of claim 67, wherein the filtration system comprises a filter having a geometry that is cone, pleated, candle, stack, flat, wraparound, or a combination comprising at least one of the foregoing geometries.

71. The method of claim 66, wherein the poly(arylene ether), poly(alkenyl aromatic), and the mixture are independently in the form of a melt, and wherein the melt is filtered through a melt filtration system.

72. The method of claim 71, wherein the melt filtration system comprises a sintered metal filter, a metal mesh filter, a fiber metal felt filter, a ceramic filter, or a combination comprising at least one of the foregoing filters.

73. The method of claim 71, wherein the melt filtration system comprises a filter having a geometry that is cone, pleated, candle, stack, flat, wraparound, or a combination comprising at least one of the foregoing geometries.

74. The method of claim 71, wherein the melt filtration system comprises a filter having a pore size of about 0.5 to about 200 micrometers.

75. The method of claim 63, wherein the mixture is formed by melt blending the poly(arylene ether) and poly(alkenyl aromatic) to form a melt.

76. The method of claim 75, wherein the melt blending occurs in a twin screw counter-rotating extruder, a twin screw co-rotating extruder, a single screw extruder, a single screw reciprocating extruder, or a ring extruder.

77. The method of claim 76, wherein the extruder has a specific throughput rate of about 0.5 kg/cm^3 to about 8 kg/cm^3.

78. The method of claim 76, wherein the extruder further comprises a melt pump.

79. The method of claim 76, wherein the melt has a residence time in the extruder of less than or equal to 1 minute.

80. The method of claim 76, further comprising compounding the poly(arylene ether) and poly(alkenyl aromatic) prior to melt blending.

81. The method of claim 80, wherein the compounding is performed in a counterrotating conical extruder, or a counterrotating extruder.

82. The method of claim 63, wherein the mixture is formed by combining poly(arylene ether) and poly(alkenyl aromatic) to form a solution mixture comprising poly(arylene ether), poly(alkenyl aromatic), and solvent.

83. The method of claim 63, wherein the mixture is formed by combining poly(arylene ether) powder and poly(alkenyl aromatic) powder to form a powder mixture.

84. The method of claim 63, wherein the combining is performed in an environment substantially free of particulate impurities.

85. The method of claim 63, wherein the combining is performed under an inert atmosphere.

86. The method of claim 63, wherein the polymeric material is obtained from the mixture by precipitation or by the removal of solvent using a devolatilization extruder, a flash vessel, a distillation system, or a combination comprising at least one of the foregoing.

87. The method of claim 63, further comprising superheating the mixture; filtering the superheated mixture to form a superheated filtrate; feeding the superheated filtrate to an extruder, wherein the extruder comprises an upstream vent and a downstream vent; removing solvent from the filtrate via the upstream vent and the downstream vent; and obtaining a polymeric material.

88. The method of claim 63, further comprising filtering the mixture to form a filtrate; superheating the filtrate; feeding the superheated filtrate to an extruder, wherein the extruder comprises an upstream vent and a downstream vent; removing solvent from the filtrate via the upstream vent and the downstream vent; and obtaining a polymeric material.

89. The method of claim 63, wherein the poly(arylene ether) is in the form of a solution fed to a devolatilization extruder and the poly(alkenyl aromatic) is added to the devolatilization extruder via a non-vented side feeder to form the mixture.

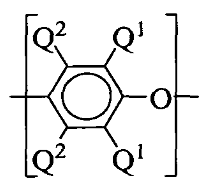
90. The method of claim 63, wherein the polymeric material is obtained in the form of a pellet.

91. The method of claim 63, wherein the polymeric material is obtained in an environment substantially free of particulate impurities.

92. The method of claim 63, wherein the packaging, storing, or packaging and storing is performed in an environment substantially free of particulate impurities.

93. The method of claim 63, wherein the obtaining is performed under an inert atomosphere.

94. The method of claim 63, wherein the poly(arylene ether) comprises a plurality of structural units of the structure

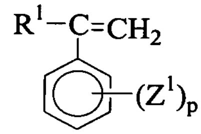


wherein for each structural unit, each Q^1 is independently halogen, primary or secondary C_1-C_7 alkyl, phenyl, haloalkyl, aminoalkyl, hydrocarbonoxy, or halohydrocarbonoxy wherein at least two carbon atoms separate the halogen and oxygen atoms; and each Q^2 is independently hydrogen, halogen, primary or secondary lower alkyl, phenyl, haloalkyl, hydrocarbonoxy, or halohydrocarbonoxy wherein at least two carbon atoms separate the halogen and oxygen atoms.

95. The method of claim 94, wherein the poly(arylene ether) has an intrinsic viscosity of about 0.10 to about 0.60 deciliters per gram as measured in chloroform at 25°C.

96. The method of claim 63, wherein the poly(arylene ether) is salicylate capped poly(arylene ether).

97. The method of claim 63, wherein the poly(alkenyl aromatic) contains at least 25% by weight of structural units derived from an alkenyl aromatic monomer of the formula



wherein R^1 is hydrogen, C_1-C_8 alkyl, or halogen; Z^1 is vinyl, halogen or C_1-C_8 alkyl; and p is 0 to 5.

98. The method of 63, wherein the poly(alkenyl aromatic) is atactic crystal polystyrene.

99. The method of claim 63, wherein the polymeric material comprises about 90 to about 10 percent by weight of the poly(arylene ether) and about 10 to about 90 percent by weight of the poly(alkenyl aromatic).

100. The method of claim 63, wherein the polymeric material comprises about 60 to about 30 percent by weight of the poly(arylene ether) and about 40 to about 70 percent by weight of the poly(alkenyl aromatic).

101. The method of claim 63, wherein the polymeric material further comprises flame retardants, mold release agents, lubricants, antioxidants, thermal stabilizers, ultraviolet stabilizers, pigments, dyes, colorants, anti-static agents, conductive agents, or or a combination comprising at least one of the foregoing additives.

102. The method of claim 63, wherein the solvent is a halogenated aromatic solvent, a halogenated aliphatic solvent, a non-halogenated aromatic solvent, a non-halogenated aliphatic solvent, or a combination comprising at least one of the foregoing solvents.

103. The method of claim 63, wherein the solvent is ortho-dichlorobenzene or toluene.

104. The method of claim 63, wherein the polymeric material is obtained in the form of a pellet, powder, or flake.

105. An article comprising the polymeric material prepared by the method of claim 63, wherein the article is formed by injection molding, direct injection molding, blow molding, extrusion, sheet extrusion, film extrusion, profile extrusion, pultrusion, compression molding, thermoforming, pressure forming, hydroforming, or vacuum forming.

106. A data storage medium comprising the polymeric material prepared by the method of claim 63.

107. A method of preparing a polymeric material, comprising:

reacting a monohydroxy aromatic compound in the presence of a catalyst, oxygen, and a solvent to form a reaction mixture comprising a poly(arylene ether);

combining the poly(arylene ether) with a poly(alkenyl aromatic) to form a mixture;

obtaining a polymeric material from the mixture, wherein the polymeric material comprises poly(arylene ether) and poly(alkenyl aromatic);

purifying the monohydroxy aromatic compound, the solvent, the reaction mixture, the poly(arylene ether), the poly(alkenyl aromatic), the mixture, the polymeric material, or a combination of the foregoing resulting in the polymeric material substantially free of visible particulate impurities; and

packaging or storing the polymeric material.

108. A method of preparing a polymeric material, comprising:

reacting a monohydroxy aromatic compound in the presence of a catalyst, oxygen, and a solvent to form a reaction mixture comprising a poly(phenylene ether);

precipitating the poly(arylene ether) from the reaction mixture to obtain poly(phenylene ether) powder;

mixing the poly(phenylene ether) powder and polystyrene in a solvent to form a mixture, wherein the amount of poly(phenylene ether) powder and polystyrene in the solvent is less than or equal to about 75 weight percent based on the total weight of poly(phenylene ether) powder, polystyrene, and solvent;

superheating the mixture and filtering the superheated mixture through a filtration system comprising sintered metal filters to form a filtrate;

concentrating the filtrate by removal of solvent from the filtrate to form a concentrated filtrate;

introducing the concentrated filtrate to an extruder, wherein the extruder comprises an upstream vent and a downstream vent;

removing solvent from the concentrated filtrate via the upstream vent and the downstream vent; and

isolating a polymeric material from the concentrated filtrate;

wherein the polymeric material comprises poly(phenylene ether) and polystyrene.

109. The method of claim 108, wherein the extruder operation is characterized by a ratio of a feed rate in kilograms per hour to an extruder screw speed in revolutions per minute, the ratio being about 0.045 to about 45.

110. The method of claim 108, wherein the concentrated filtrate is pressurized and introduced to the extruder via a pressure control valve.

111. The method of claim 108, wherein the extruder further comprises a side feeder, wherein the side feeder comprises a side feeder vent operated at about 750 mm of Hg or greater or at about 750 of Hg or less; and wherein the upstream vent is operated at about 750 mm of Hg or greater or about 750 mm of Hg or less, and wherein the downstream vent is operated at about 750 mm of Hg or less.

112. The method of claim 111, wherein the concentrated filtrate is introduced to the extruder via a pressure control valve located on the side feeder.